

**R E M A R K S**

**I.     Introduction**

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

**II.    The Rejection Of Claims 1 And 3-8 Under 35 U.S.C. § 103**

Claims 1, 3 and 5-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dobson et al. (USP No. 6,265,823) in view of Klabunde (USP No. 5,990,373); claim 4 as being unpatentable over Dobson in view of Klabunde and further in view of Tsukada et al. (USP No. 4,937,150); claim 7 as being unpatentable over Dobson in view of Klabunde and further in view of Hseuh et al. (USP No. 5,587,329); and claim 8 as being unpatentable over Dobson in view of Hseuh. Applicants respectfully submit that Dobson, Klabunde, Tsukada and Hseuh fail to render the pending claims obvious for at least the following reasons.

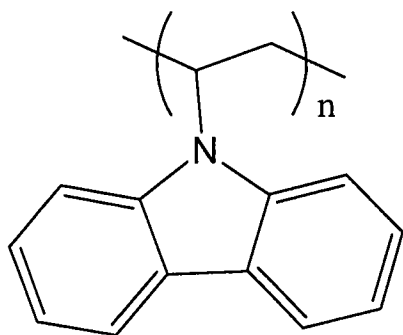
With regard to the present disclosure, independent claim 1 recites a phosphor element comprising a pair of electrodes facing each other and a phosphor layer interposed between the pair of electrodes and including a semi-conductive phosphor fine particle in which at least a part of a surface is covered with a conductive organic material. The conductive organic material is chemically adsorbed on the surface of the semi-conductive phosphor fine particle by a dehydration reaction between a hydroxide group of the surface of the semi-conductive phosphor fine particle and the conductive organic material.

One feature of the present disclosure is that the conductive material which covers at least a part of the semi-conductive phosphor fine particle is adsorbed on the surface of the particle via a dehydration reaction between a hydroxide group of the surface of the particle and the organic

material. In order for a dehydration reaction to occur, a hydroxide group of one surface must combine with a hydrogen atom of the other surface to form  $H_2O$  which is removed from the two surfaces, hence a de-hydration (loss of water) reaction.

Dobson teaches a phosphor layer having polyvinylcarbazole (PVK) as a conductive organic material. While it is noted that PVK contains an amino functional group and therefore, chemical adsorption takes place, it is admitted that Dobson is silent with regard to a dehydration process. However, it is alleged that Klabunde teaches a dehydration reaction of a hydroxide group and accordingly, it would have been obvious to “add a dehydration reaction between a hydroxide group on the surface of Dobson’s semi-conductive phosphor fine particle and the conductive organic material, as disclosed by the teaching of Klabunde”. Applicants respectfully disagree.

Applicants would point that one skilled in the art would know that it is not possible to simply “add a dehydration reaction”. As discussed above, a dehydration reaction (loss of  $H_2O$ ) requires a hydroxide group ( $-OH$ ) and a hydrogen atom ( $-H$ ). However, the structure of polyvinylcarbazole is shown below:



As can be seen from the structure, the amine group in PVK is a tertiary amine, and as such, no hydrogen atoms are available to combine with hydroxide groups in a dehydration

reaction. As such, the conductive organic compound of Dobson cannot, as suggested by the Examiner, “add a dehydration reaction”. As such, it is clear that the combination of Dobson and Klabunde fails to teach or suggest all of the limitations of claim 1 of the present disclosure.

Turning to claim 8, independent claim 8 recites, in-part, a display device comprising a luminescent array in which phosphor elements are arranged in a plane. The phosphor element comprises a pair of electrodes facing each other, a phosphor layer interposed between the pair of electrodes and includes a semi-conductive phosphor fine particle in which at least a part of a surface is covered with a conductive organic material.

It is alleged that Dobson discloses a semi-conductive phosphor fine particle in which at least a part of a surface is covered with a conductive organic material, such as PVK. However, as discussed above, the conductive organic material of Dobson (PVK) fails to disclose that part of a surface of the particle may be covered with a conductive organic material as the conductive organic material will not undergo a dehydration reaction. Furthermore, Hseuh does not appear to remedy this deficiency. Accordingly, Dobson, alone or in combination with Hseuh, fails to teach or disclose all of the limitations of claim 8.

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 580 (CCPA1974). As Dobson, Klabunde and Hseuh, at a minimum, fail to describe the limitations of independent claims 1 and 8, it is submitted that Dobson, Klabunde and Hseuh, alone or in combination, do not render claims 1 and 8 obvious. Accordingly, it is respectfully requested that the § 103 rejection of claims 1 and 8, and any pending claims dependent thereon be withdrawn.

**III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable**

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1 and 8 are patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.


**IV. Conclusion**

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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